December 9, 1886.

Professor STOKES, D.C.L., President, in the Chair.

The Presents received were laid on the table, and thanks ordered for them.

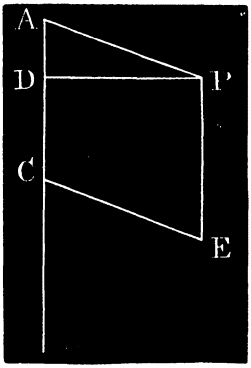
The President announced that he had appointed as Vice-Presidents—

The Treasurer.
Dr. Archibald Geikie.
Professor Bartholomew Price.
Sir George Richards.

The following Papers were read:—

I. "Note to a Paper on the Geometrical Construction of the Cell of the Honey Bee ('Roy. Soc. Proc.,' vol. 39, page 253)." By HENRY HENNESSY, F.R.S., Professor of Applied Mathematics in the Royal College of Science, Dublin. Received November 16, 1886.

The result obtained in the paper on the cell of the honey bee, read November 26, 1885, by which the side of one of the lozenges composing the cell was found to be three times the difference between the two parallel edges forming the sides of one of the trapeziums of the prism, gives a very simple method for constructing the figure as follows. On a straight line take a part AD, and lay



off DC equal to twice AD, from D erect a perpendicular, and with radius AC = 3DA cut off DP; AC and AP are sides of the lozenge ACEP, which fulfils the required conditions. It is manifest that from this lozenge the remaining two lozenges and also the six trapeziums can be immediately constructed.

The triangular pyramid which terminates the bee's cell may be inscribed in a sphere whose diameter is three times the side of one of the edges of the pyramid. The base of this pyramid is an equilateral triangle, the side of which is $h\sqrt{3}$, and whose circumscribing circle has $2h$ for its diameter. This diameter is a chord of the spherical segment whose versed sine is x. Hence, if D is the diameter of the sphere in which $2h$ is a chord, $x\mathrm{D}=h^2+x^2$, but also $h=2\sqrt{2}x$, and $s=3x$, whence

$$\mathrm{D}=9x=3s.$$

We have also

$$\mathrm{D}=\frac{9h}{2\sqrt{2}}>2h.$$

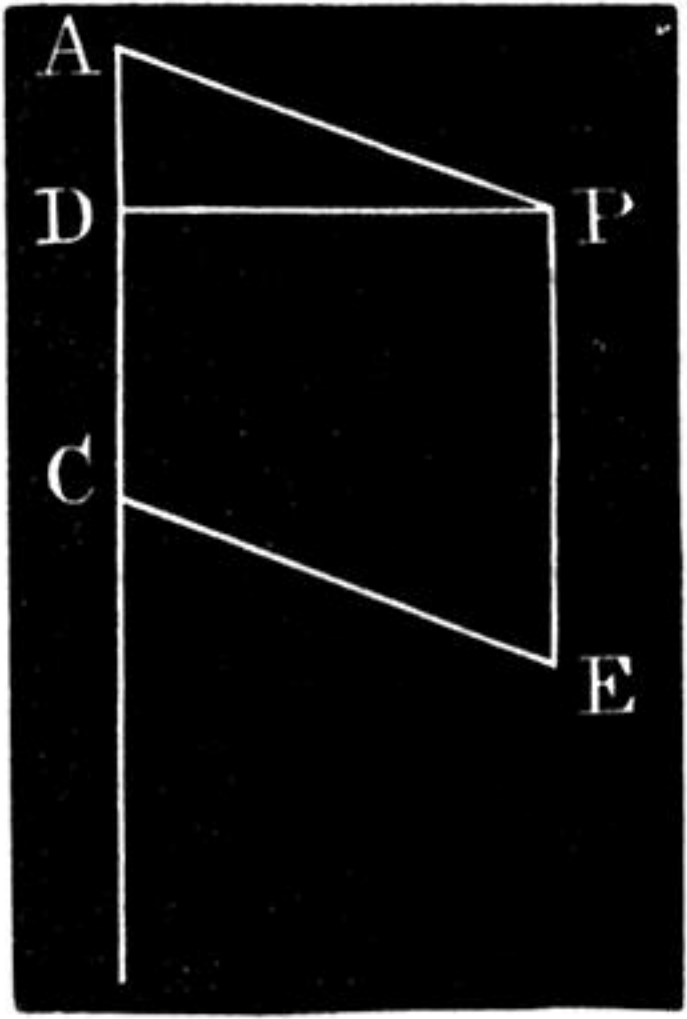
Hence the sphere contains within it all that part of the bee's cell bounded by the three lozenges, together with as much of the hexagonal prism as may be measured by twice the side of a lozenge on the shorter edge of the prism.

This result, together with the extremely simple mode now given for constructing the figure, divests the problem of the complexity and difficulty with which it was formerly sometimes regarded, and it may also possibly enable the naturalist to more readily explain the action of the bees in moulding the cells of the honeycomb to their observed shapes.

II. "A New Method for the Quantitative Estimation of the Micro-organisms present in the Atmosphere." By PERCY F. FRANKLAND, Ph.D., B.Sc., F.I.C., F.C.S., Assoc. Roy. Sch. Mines. Communicated by Professor FRANKLAND, D.C.L., F.R.S. Received November 15, 1886.

(Abstract.)

The author commences by giving a sketch of some of the more important methods which have been devised for the bacterioscopic examination of air. In these he includes the experiments of Pasteur, who was the first to show that the air at different places varied in the number of micro-organisms which it contained, and of Tyndall, who proved that the microbes suspended in the air become rapidly deposited in the absence of any disturbing influence. He further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